

L Number	Hits	Search Text	DB	Time stamp
2	4	"6020259"	USPAT; US-PGPUB	2004/10/05 10:58
1	9	"6221792"	USPAT; US-PGPUB	2004/10/05 10:58
3	10	"6001729"	USPAT; US-PGPUB	2004/10/05 10:59
4	2	"6001729" and (in adj situ)	USPAT; US-PGPUB	2004/10/05 11:00
5	0	"6221792" and (in adj situ)	USPAT; US-PGPUB	2004/10/05 11:01
6	0	"6020259" and (in adj situ)	USPAT; US-PGPUB	2004/10/05 11:00
7	8	"5994220"	USPAT; US-PGPUB	2004/10/05 11:00
8	0	"5994220" and (in adj situ)	USPAT; US-PGPUB	2004/10/05 11:01
9	332	((selective or selectively) near3 (deposition or depositing or deposit)) and (in adj situ)	USPAT; US-PGPUB	2004/10/05 11:02
10	530	((selective or selectively) near3 (deposition or depositing or deposit)) same silicide	USPAT; US-PGPUB	2004/10/05 11:02
11	24	((selective or selectively) near3 (deposition or depositing or deposit)) same silicide) and (in adj situ)	USPAT; US-PGPUB	2004/10/05 11:03
12	13	((selective or selectively) near3 (deposition or depositing or deposit)) same silicide) and (in adj situ)) and @ad<19980407	USPAT; US-PGPUB	2004/10/05 11:03

US-PAT-NO: 5187120

DOCUMENT-IDENTIFIER: US 5187120 A

TITLE: Selective deposition of metal on
metal nitride to form
interconnect

----- KWIC -----

Brief Summary Text - BSTX (7):

What is needed is a tungsten deposition process for electrical contacts and vias that (1) is highly selective for W deposition on silicon, silicide and metal, (2) allows W deposition in vias and as electrical contacts over a wide range of via depths and diameters and contact areas, and (3) provides very low contact resistance at a W/TiSi.sub.x interface.

Detailed Description Text - DETX (10):

In situ formation of TiN on a top surface of TiSi.sub.2 is discussed by Willemsen et al., Jour. Vac. Sci Technol, vol. B6 (1988) pp. 53-61, incorporated by reference herein. One procedure required annealing, at a temperature $T \approx 600^\circ \text{C}$, of a ti-containing film deposited on a Si surface in a nitrogen-containing atmosphere (N_2 or NH_3) and results in formation of a TiN-TiSi.sub.2 double layer. This method often produces an intermediate layer of uncombined Ti. A second procedure requires use of annealing temperatures $T > 800^\circ \text{C}$, and an uncombined layer of Ti is not present. The Ti film is deposited by Ti sputtering on Si to a thickness of 90-100 nm. Titanium nitride, TiN, is formed only near the surface, at a fraction of the 99-100 nm depth of the Ti

film, but the thickness of the TiN layer increases with initial thickness of the Ti-containing film. For annealing temperatures $T > 800^{\circ}\text{C}$, the rates of nitridization of $\text{TiSi}_{0.2}$ and of TiSi_x in NH_3 are similar at the temperatures used. However, where an N_2 atmosphere is provided at these elevated annealing temperatures, the nitridization rate of TiSi_x is 5-10 times the nitridization rate of $\text{TiSi}_{0.2}$ for such temperatures. Nitridization of $\text{TiSi}_{0.2}$ to form a TiN layer is also discussed by Wittmer, Appl. Phys. Lett., vol. 52 (1988) pp. 1573-1574, and by Joshi et al., Appl. Phys. Lett., vol. 54 (1989) pp. 1672-1674. None of these workers recognized that TiN can be prepared in at least two phases, with a first phase promoting W nucleation thereon and a second phase resisting W nucleation thereon.

Other Reference Publication - OREF (2):

M. F. C. Willemsen et al., "In Situ Investigation of TiN Formation on Top of $\text{TiSi}_{0.2}$ ", Jour. Vac. Sci. Technol., vol. B6 (1988) pp. 53-61.